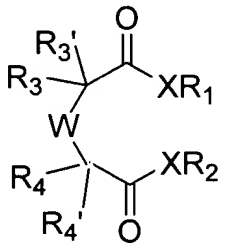
AMENDMENTS TO THE CLAIMS

1. **(Currently amended)** A method for vaccinating a mammal against an antigen, comprising:

introducing into the mammal an effective dose of the antigen or an epitope(s) thereof; and

administering to the mammal a topical treatment in an amount sufficient to increase the number of antigen-bearing dendritic cells in a lymphoid organ,

wherein introducing the antigen and administering the treatment are performed independently in any order, wherein the antigen or epitope(s) thereof is introduced into the mammal by disrupting the stratum corneum, wherein the topical treatment comprises a lipophilic molecule capable of traversing the stratum corneum and in the absence of an antigen inducing dendritic cells to mature and migrate to the draining lymphoid organ, and wherein said lipophilic molecule is ≤500 daltons and is selected from the following formulas:



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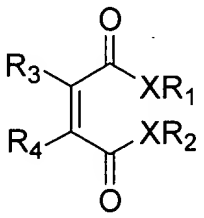

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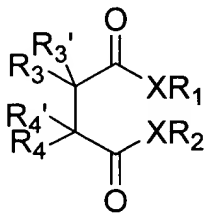


(3)

wherein R_1 and R_2 are independently alkyl side chains containing 1 to 16 carbon atoms, C_1 to C_{16} substituted alkyl, C_3 to C_{10} cycloalkyl, C_3 to C_{10} substituted cycloalkyl, C_2 to C_{10} alkenyl, C_2 to C_{10} substituted alkenyl, C_2 to C_{10} alkynyl, C_2 to C_{10} substituted alkynyl;

wherein R_3, R_3', R_4 and R_4' are selected independently from the group consisting of hydrogen atom, hydroxy group, halogen group, alkyl side chains containing 1 to 16 carbon atoms, C_1 to C_{16} substituted alkyl, C_3 to C_{10} cycloalkyl, C_3 to C_{10} substituted cycloalkyl, C_2 to C_{10} alkenyl, C_2 to C_{10} substituted alkenyl, C_2 to C_{10} alkynyl, C_2 to C_{10} substituted alkynyl, C_7 to C_{16} phenylalkyl, C_7 to C_{16} substituted phenylalkyl, phenyl, substituted phenyl, naphthyl and substituted naphthyl;

wherein X is an oxygen or a nitrogen atom; and

wherein W is a saturated or unsaturated chain consisting of C_1-C_{10} alkyl, C_1-C_{10} substituted alkyl, C_7-C_{10} phenylalkyl, C_7-C_{16} substituted phenylalkyl, phenyl, substituted phenyl, naphthyl, substituted naphthyl, C_3-C_7 cycloalkyl and C_3-C_7 substituted cycloalkyl group, and wherein each terminus of the chain is bonded to the carbon $C(R_3R_3')$ and $C(R_4R_4')$.

2.-3. **(Canceled)**

4. **(Withdrawn)** The method of Claim 3, wherein W contains one or more heteroatoms selected from the group consisting of nitrogen, sulfur, and oxygen in combination or independently.

5. **(Withdrawn)** The method of Claim 3, wherein the R_1 and R_2 groups are identical C_1 to C_6 alkyl moieties.

6. **(Previously presented)** The method of Claim 1, wherein R_1 and R_2 are $(CH_2)_3$-CH_3.

7. **(Withdrawn)** The method of Claim 3, wherein X is an oxygen and R_3 and R_4 are linked to form a ring structure which, including the W chain, comprises a saturated or unsaturated C_3 to C_{10} cycloalkyl, C_3 to C_{10} substituted cycloalkyl, C_7 to C_{16} phenylalkyl, C_7 to C_{16} substituted phenylalkyl, phenyl, substituted phenyl, naphthyl or substituted naphthyl.

8. **(Previously presented)** The method of Claim 1, wherein X is an oxygen and R_3 and R_4 are linked to form a ring structure which, including the W chain, comprises a saturated or unsaturated C_3 to C_{10} cycloalkyl, C_3 to C_{10} substituted cycloalkyl, C_7 to C_{16} phenylalkyl, C_7 to C_{16} substituted phenylalkyl, phenyl, substituted phenyl, naphthyl or substituted naphthyl, and wherein the ring structure is an aryl group.

9. **(Withdrawn)** The method of Claim 7, wherein the ring structure contains one or more heteroatoms selected from the group consisting of nitrogen, sulfur, and oxygen.

10. **(Withdrawn)** The method of Claim 3, wherein the lipophilic molecule comprises a terpene.

11. **(Previously presented)** The method of Claim 1, wherein the lipophilic molecule is selected from the group consisting of dibutyl phthalate, dibutyl-D-tartrate, N,N-diethyl-toluamide, dibutylfumarate, di(2-ethylhexyl)fumarate, diisooctylmaleate, diethylhexylmaleate, diisooctylfumarate, benzoic acid, bihenylmaleate, dioctylphthalate, dibutylmaleate,

dioctymaleate, dibutylsuccinate, dioctylsuccinate, dinonylphthalate, diisononylphthalate, dimethylphthalate, diethylphthalate, dipropylphthalate, diphenylphthalate, dibenzylbutylphthalate, and diethylmethylphthalate.

12. **(Canceled)**

13. **(Previously presented)** The method of Claim 1, wherein the lipophilic molecule has an oil/water partition coefficient >1.

14. **(Previously presented)** The method of Claim 13, wherein the lipophilic molecule has an oil/water partition coefficient of between about 10 and about 10^6.

15. **(Previously presented)** The method of Claim 1, wherein the topical treatment further comprises an organic solvent.

16. **(Original)** The method of Claim 15, wherein the organic solvent is acetone.

17. **(Previously presented)** A method for vaccinating a mammal against a target antigen, comprising:

introducing into the mammal an effective dose of said target antigen or an epitope(s) thereof; and

administering to the mammal a topical treatment in an amount sufficient to increase the number of antigen-bearing dendritic cells presenting said target antigen in a lymphoid organ, wherein the topical treatment in the absence of an antigen is capable of inducing immature dendritic cells to mature and migrate to the draining lymphoid organ,

wherein introducing said target antigen and administering the treatment are performed independently in any order, and wherein the topical treatment comprises application of ultrasound energy.

18. **(Original)** The method of Claim 1, wherein the antigen or epitope(s) thereof is introduced into the mammal by a virus, a bacterium, a fungus, or a parasite.

19. **(Currently amended)** A method for vaccinating a mammal against a target antigen, comprising:

introducing into the mammal an effective dose of said target antigen or an epitope(s) thereof; and

administering <u>internally</u> to the mammal a ~~topical~~ treatment in an amount sufficient to increase the number of antigen-bearing dendritic cells presenting said target antigen in

a lymphoid organ, wherein the ~~topical~~ treatment ~~which~~ in the absence of an antigen is capable of inducing immature dendritic cells to mature and migrate to the draining lymphoid organ,

wherein introducing said target antigen and administering the treatment are performed independently in any order, and wherein said target antigen or epitope(s) thereof is introduced into the mammal by ingestion.

20. **(Canceled)**

21. **(Original)** The method of Claim 1, wherein the antigen or epitope(s) thereof is introduced into the mammal by injection.

22. **(Original)** The method of Claim 21, wherein the injection is made via a route selected from the group consisting of intraepidermal, intradermal, subcutaneous, intramuscular, intravascular, or into a specific organ.

23. **(Currently amended)** The method of Claim 17 ~~1~~, wherein the antigen or epitope(s) thereof is introduced into the mammal via delivery to respiratory, urogenital or gastrointestinal tracts.

24. **(Previously presented)** A method for vaccinating a mammal against an antigen, comprising:

introducing into the mammal an effective dose of the antigen or an epitope(s) thereof; and

administering to the mammal a topical treatment in an amount sufficient to increase the number of antigen-bearing dendritic cells in a lymphoid organ,

wherein introducing the antigen and administering the treatment are performed independently in any order, wherein said topical treatment comprises a lipophilic molecule capable of traversing the stratum corneum and inducing dendritic cells to migrate to the draining lymphoid organ, and wherein the antigen or epitope(s) thereof is introduced into the mammal by disrupting the stratum corneum and transferring cells comprising the antigen or epitope(s) thereof.

25. **(Canceled)**

26. **(Canceled)**

27. **(Original)** The method of Claim 1, wherein the antigen or epitope(s) thereof is endogenous to the mammal and is either normal or pathologic.

28. **(Currently amended)** The method of Claim 1, wherein the amount of topical treatment is sufficient to increase ~~in~~ the number of dendritic cells in the lymphoid organ by a factor of about 2 to about 1000 times the number of resident dendritic cells in an untreated mammal.

29. **(Previously presented)** The method of Claim 28, wherein the number of dendritic cells in the lymphoid organ is increased by a factor of about 5 to about 100 times the number of resident dendritic cells in an untreated mammal.

30. **(Original)** The method of Claim 1, wherein the amount of topical treatment is further characterized as being sufficient to increase local release of an endogenous inducer of dendritic cell migration and maturation.

31. **(Original)** The method of Claim 1, wherein the amount of topical treatment is further characterized as being sufficient to alter the plasma membrane expression or function of an adhesion molecule.

32.-36. **(Canceled)**

37. **(Withdrawn)** The method of Claim 36, wherein W contains one or more heteroatoms selected from the group consisting of nitrogen, sulfur, and oxygen in combination or independently.

38.-41. **(Canceled)**

42. **(Withdrawn)** The method of Claim 36, wherein the ring structure contains one or more heteroatoms selected from the group consisting of nitrogen, sulfur, and oxygen.

43.-50. **(Canceled)**

51. **(Original)** A method for vaccinating a mammal against an antigen, comprising:

injecting into the mammal an effective dose of the antigen or an epitope(s) thereof; and

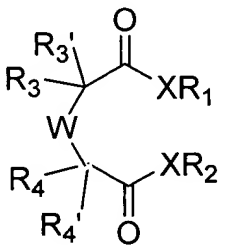
administering to the mammal a topical treatment in an amount sufficient to increase the number of antigen-bearing dendritic cells in a draining lymphoid organ,

wherein the topical treatment comprises a lipophilic molecule with a molecular weight of ≤500 daltons.

52. **(Previously presented)** A method for enhancing an immune response in a mammal against an endogenous antigen, comprising

repeatedly topically administering to the mammal a lipophilic compound having a molecular weight ≤500 daltons, wherein the lipophilic compound is applied in an amount sufficient to increase the number of antigen-bearing dendritic cells presenting said endogenous antigen in a lymphoid organ,

wherein said lipophilic compound is selected from the following formulas:



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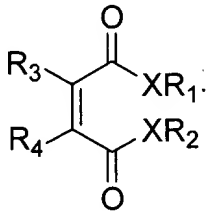

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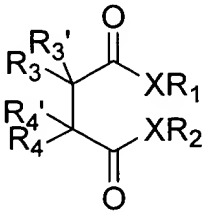


(3)

wherein R_1 and R_2 are independently alkyl side chains containing 1 to 16 carbon atoms, C_1 to C_{16} substituted alkyl, C_3 to C_{10} cycloalkyl, C_3 to C_{10} substituted cycloalkyl, C_2 to C_{10} alkenyl, C_2 to C_{10} substituted alkenyl, C_2 to C_{10} alkynyl, C_2 to C_{10} substituted alkynyl;

wherein R_3, R_3', R_4 and R_4' are selected independently from the group consisting of hydrogen atom, hydroxy group, halogeno group, alkyl side chains containing 1 to 16 carbon atoms, C_1 to C_{16} substituted alkyl, C_3 to C_{10} cycloalkyl, C_3 to C_{10} substituted cycloalkyl, C_2 to C_{10} alkenyl, C_2 to C_{10} substituted alkenyl, C_2 to C_{10} alkynyl, C_2 to C_{10} substituted alkynyl, C_7 to C_{16} phenylalkyl, C_7 to C_{16} substituted phenylalkyl, phenyl, substituted phenyl, naphthyl and substituted naphthyl;

wherein X is an oxygen or a nitrogen atom; and

wherein W is a saturated or unsaturated chain consisting of C_1-C_{10} alkyl, C_1-C_{10} substituted alkyl, C_7-C_{10} phenylalkyl, C_7-C_{16} substituted phenylalkyl, phenyl, substituted phenyl, naphthyl, substituted naphthyl, C_3-C_7 cycloalkyl and C_3-C_7 substituted cycloalkyl group, and wherein each terminus of the chain is bonded to the carbon $C(R_3R_3')$ and $C(R_4R_4')$.

53. **(Original)** The method of Claim 52, wherein said endogenous antigen is a tumor antigen.

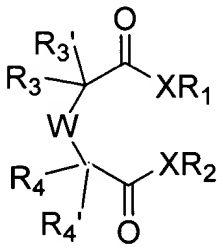
54. **(Canceled)**

55. **(Previously presented)** A method for vaccinating a mammal against a target antigen, comprising:

injecting the mammal with an effective dose of said target antigen or an epitope(s) thereof; and

administering internally to the mammal a treatment in an amount sufficient to increase the number of dendritic cells presenting said target antigen in a lymphoid organ,

wherein the treatment comprises a lipophilic molecule with a molecular weight of ≤500 daltons, which in the absence of an antigen is capable of inducing immature dendritic cells to mature and migrate to the draining lymphoid organ, and wherein said lipophilic molecule is selected from the following formulas:



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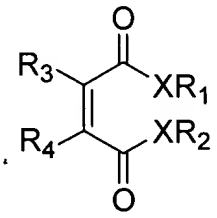

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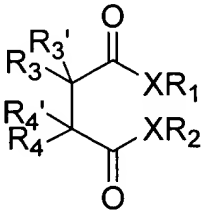

(3)

wherein R_1 and R_2 are independently alkyl side chains containing 1 to 16 carbon atoms, C_1 to C_{16} substituted alkyl, C_3 to C_{10} cycloalkyl, C_3 to C_{10} substituted cycloalkyl, C_2 to C_{10} alkenyl, C_2 to C_{10} substituted alkenyl, C_2 to C_{10} alkynyl, C_2 to C_{10} substituted alkynyl;

wherein R_3, R_3', R_4 and R_4' are selected independently from the group consisting of hydrogen atom, hydroxy group, halogeno group, alkyl side chains containing 1 to 16 carbon atoms, C_1 to C_{16} substituted alkyl, C_3 to C_{10} cycloalkyl, C_3 to C_{10} substituted cycloalkyl, C_2 to C_{10} alkenyl, C_2 to C_{10} substituted alkenyl, C_2 to C_{10} alkynyl, C_2 to C_{10} substituted alkynyl, C_7 to C_{16} phenylalkyl, C_7 to C_{16} substituted phenylalkyl, phenyl, substituted phenyl, naphthyl and substituted naphthyl;

wherein X is an oxygen or a nitrogen atom; and

wherein W is a saturated or unsaturated chain consisting of C_1-C_{10} alkyl, C_1-C_{10} substituted alkyl, C_7-C_{10} phenylalkyl, C_7-C_{16} substituted phenylalkyl, phenyl, substituted phenyl, naphthyl, substituted naphthyl, C_3-C_7 cycloalkyl and C_3-C_7 substituted cycloalkyl group, and wherein each terminus of the chain is bonded to the carbon $C(R_3R_3')$ and $C(R_4R_4')$.

56. **(Canceled)**

57. **(Canceled)**

58. **(Previously presented)** A method for vaccinating a mammal against a target antigen, comprising:

injecting into the mammal an effective dose of said target antigen or an epitope(s) thereof; and

administering to the mammal a topical treatment in an amount sufficient to increase the number of dendritic cells in a draining lymphoid organ in the absence of said target antigen,

wherein the topical treatment is capable of inducing immature dendritic cells to mature and migrate to the draining lymphoid organ in the absence of an antigen.

59. **(Withdrawn)** A method for vaccinating a mammal against an antigen, comprising:

administering to the mammal an effective dose of the antigen or an epitope(s) thereof; and

administering to the mammal a topical treatment comprising camphor in an amount sufficient to increase the number of antigen-bearing dendritic cells in a draining lymphoid organ.